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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/639,259	08/15/2000	Helen H. Kim	Kim 6-8	1586

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MENDELSON AND ASSOCIATES PC
1515 MARKET STREET
SUITE 715
PHILADELPHIA, PA 19102

EXAMINER

AHN, SAM K

ART UNIT PAPER NUMBER

2634

3

DATE MAILED: 10/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/639,259

Applicant(s)

KIM ET AL.

Examiner

Sam K Ahn

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

1. Claims 1-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1 and 14 recite the limitation of a method and apparatus of comprising a comparator receiving the received signal and the estimated signal from each channel estimator. In the specification on page 3, lines 18-23, and in Fig.2, the estimated signal is subtracted from the received signal. It does not disclose the limitation recited where the comparator receives both received signal and the estimated signal. Since the signal received by the comparator is a signal already subtracted, the current disclosure would not reasonably convey to one skilled in the art as the comparator would not be able to differentiate the two signal, received signal from estimated signal, from a single received signal received by the comparator.

Claims 2-13 and 15-17 directly or indirectly depend on claims 1 and 17.

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Assuming that the 112 1st paragraph rejection is understood as the comparator receiving the signal of the difference between the received signal and the estimated signal, the rejection is as follows.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4, 7-12, 14, 15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Shiokawa ('724).

Regarding claims 1 and 14, Shiokawa discloses method and apparatus of a receiver (see Fig.1) for a received signal having two or more data levels, a multilevel signal (note Abstract), the received signal having been transmitted over a transmission channel where further comprising two or more channel estimators (30~34 in Fig.1), at least one channel estimator for each different data level for the received signal (having five different data levels, +1.5, +1, 0, -1 and -1.5 in 35~39 in Fig.1) each channel estimator being configured to model the transmission channel to generated an estimated signal corresponding to one of the data levels, and a comparator (5) configured to receive the *signals from the channel estimators* and select and output data level for the received signal. (note col.4, lines 10-52)

Regarding claims 2 and 15, Shiokawa teaches all subject matter claimed, as applied to claim 1 or 14. Shiokawa further teaches wherein each channel estimator implements a 2nd order model of the transmission channel. (see 35~39 in Fig.2)

Regarding claim 4, Shiokawa teaches all subject matter claimed, as applied to claim 2. Shiokawa further discloses wherein each channel estimator (30~34) comprises a processing path for each order term (35~39) in the model of the transmission channel.

Regarding claim 7, Shiokawa teaches all subject matter claimed, as applied to claim 1. Shiokawa, as illustrated in Fig.1, teaches wherein the two or more channel estimators (30~34) comprise one or more adaptive equalizers (1), adaptive equalizer configured to receive a current data level corresponding to one of the data levels and to generate an input signal for one or more of the channel estimators.

Regarding claims 8 and 9, Shiokawa teaches all subject matter claimed, as applied to claim 7 and 8, respectively. Shiokawa further teaches wherein at least one adaptive equalizer (1) is shared by two or more of the channel estimators (35~39), and further, wherein all of the channel estimators share a single adaptive equalizer.

Regarding claims 10 and 11, Shiokawa teaches all subject matter claimed, as applied to claim 7. Shiokawa further teaches wherein the tap data for each adaptive equalizer

corresponding to sliced symbols corresponding to the two or more data levels. (note col.2, line 57 – col.3, line 39)

Regarding claims 12 and 17, Shiokawa teaches all subject matter claimed, as applied to claim 1 or 14. Shiokawa further teaches a subtraction node (between 4 and 5 in Fig.1) where the channel estimator is configured to generate a difference signal between the received signal and the corresponding estimated signal, and a compare-and-select module (5) configured to receive the difference signals from the subtraction nodes and to select the output data level for the received signal based on a difference signal having a smallest absolute value. (note col.4, lines 10-52)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiokawa ('724).

Regarding claim 13, Shiokawa teaches all subject matter claimed, as applied to claim 1. Shiokawa further teaches wherein the transmission channel is an optical transmission channel as the receiver used in receiving signals from an optical discs. (note col.1, lines 9-14) Although Shiokawa does not explicitly disclose the receiver configured in a single

integrated circuit as analog circuitry, this would have been a matter of design choice.

One skilled in the art may determine to integrate certain number of functional circuitry in an integrated circuit and may determine to do so in another integrated circuit and connect the two circuits, or may determine to combine the two into one single integrated circuit.

This may all be decided by market demand, cost of production, level of difficulty in producing, and so on. Therefore, it would have been obvious to one skilled in the art at the time of invention to integrate all the functional circuitry into one integrated circuit as it is a matter of design choice in producing the receiver.

4. Claims 3 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiokawa ('724) in view of Applicant's Admitted Prior Art (AAPA).

Regarding claims 3 and 16, Shiokawa teaches all subject matter claimed, as applied to claim 2 or 15. Shiokawa teaches generating an error signal produced within the equalizer (see 16 in Fig.2) However, Shiokawa does not teach wherein the adaptive model of the transmission channel that is dynamically controlled based on an error signal generated by the comparator. AAPA discloses a slicer (108 in Fig.1, which has similar function to 5 in Fig.1 of Shiokawa) teaching the limitation of generating an error signal and being fed to equalizer (102, which has similar function to 1 in Fig.1 of Shiokawa). (note page 1, lines 26-30) Therefore, it would have been obvious to one skilled in the art at the time of invention to modify Shiokawa's teaching of generating error signal by the slicer rather than within itself for the purpose of dynamically controlling the coefficients within the

equalizer. As the equalizer does not know the output of the comparator, it would be more accurate to adjust the coefficients in the equalizer by the error signal, not within the equalizer, but by the error signal generated by the comparator, as this would determine a more accurate coefficients in adjusting the equalizer.

Allowable Subject Matter

5. Claims 5 and 6 would be allowable if rewritten to overcome the rejection(s) under 35

U.S.C. 112, first paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

Present application discloses a receiver comprising a two-level detector where two channel estimators are coupled to a comparator. Each channel estimator receives received signal and is compared to a reference data level. The difference between the received signal and estimated signal is sent to the comparator where value is determined as to which data was received. It is further recited to include the limitation of each channel estimator comprising multipliers receiving adaptive coefficients, which are generated by the error signal generated by the comparator. Closest prior art, Shiokawa teaches, in the same field of endeavor, a receiver comprising similar functions. However, Shiokawa does not teach wherein the processing path contains multipliers receiving adaptive coefficients, which are dynamically controlled by the error signal generated by the comparator.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kurth teaches an adjustable equalizer comprising plurality of detectors.

Tonami teaches a waveform equalizer comprising multilevel detectors.

Azadet et al. Discloses decision-feedback with parallel processing.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Sam Ahn** whose telephone number is **(703) 305-0754**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Stephen Chin**, can be reached at **(703) 305-4714**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

P.O. Box 1450

Alexandria, VA 22313-1450

or faxed to:

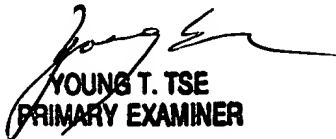
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Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Sam K. Ahn
10/20/03


YOUNG T. TSE
PRIMARY EXAMINER